STORM WATER QUALITY

# Post Construction Bulletin

*The Post Construction Bulletin is prepared by the Post Construction Inspection Team to provide a feedback loop to the Functional Units for possible program improvements per the National Pollutant Discharge Elimination System (NPDES) permit requirements.*

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# Rolled Erosion Control Products for Highway Slopes

A variety of rolled erosion control products (RECPs) are available for specification and installation along Caltrans highways for erosion prevention on adjacent slopes. This bulletin discusses the biodegradable RECPs observed on Caltrans sites by the Post Construction Inspection Team. The Team has identified some of the factors to be considered in the design, specification and installation of rolled erosion control materials on highway slopes in conjunction with revegetation.

*RECP installation on a short slope beneath a vertical support structure*

## Materials Description

Rolled erosion control products (RECPs), commonly referred to as erosion control blankets, are an approved best management practice (BMP) for short term stabilization of disturbed soil areas. Some products are manufactured from jute or coir (coconut) fiber that is woven to form a net. Other products are typically constructed of plant materials, such as straw, wood or coconut fiber held together by either one or two layers netting. This netting can be comprised of either extruded plastic or biodegradable materials.

## Appropriate Applications

These measures are typically used where disturbed soils may be particularly difficult to stabilize, including steep slopes (greater than 1:3, V:H), slopes where erosion hazard is high, slopes where mulch must be anchored, disturbed areas where plants are slow to develop, channels where flow velocities exceed approximately 1.0 m/s, and in channels to be vegetated. The specification and ultimate use of the RECP determines its composition and construction. For example, the type of fibers or netting used in the construction of an RECP might differ depending upon how long the material must last until permanent vegetation is established.

## Selection Criteria for RECPs

There are a number of criteria that should be considered before specifying an erosion control blanket for a highway site. These criteria include:

- Feasibility - Is an RECP suitable for the site conditions?
- Effectiveness - What are the performance expectations for both slope and channel protection?
- Implementation costs - What is the installed cost of the product compared to other alternatives?
- Environmental compatibility - Does netting pose any wildlife hazards, and if so, what type of blanket and/or netting should be specified?
- Availability - Is the product locally available?
- Durability – How does the product withstand the rigors of installation, particularly on very steep slopes?
- Longevity – How long must the blanket last until permanent vegetation is established?
- Long-term costs - What are the maintenance considerations, e.g. will nets or staples be a factor if the area will be routinely mowed?

*Long slope RECP installation*

## Effectiveness Testing

Testing at the San Diego State University Soil Erosion Research Laboratory (SDSU/SERL) as part of the District 7 Erosion Control Pilot Study (ECPS) and the Soil Stabilization for Temporary Slopes study (SSTS) established the erosion control effectiveness of a variety of erosion control BMPs, including RECPs. Under identical conditions of soil, slope and simulated rainfall, all of the RECPs tested reduced erosion and off-site sediment delivery by 90-100%. These results are comparable to tests conducted at the Texas Transportation Institute (TTI) and other laboratories.

## Costs

Effectiveness of erosion control measures should not be separated from the overall cost of the practice. For this reason, the table below provides the SDSU/SERL effectiveness data along with the installed cost of the practice. Additional practices and/or products, including hydraulic mulching, straw mulching, soil binders and bonded fiber matrices, are provided for comparison.

| BMP | UNIT COST INSTALLED (per hectare) | ESTIMATED RELATIVE EFFECTIVENESS |
|---|---|---|
| Hydraulic Mulching (no tackifier) | $2,000-2,200 | 50 - 60% |
| Straw Mulching (tacked or crimped) | $5,000-5,200 | 90 - 95% |
| Soil Binders (stand alone, no mulch) | $1,000-3,000 | 25 - 85% |
| Bonded Fiber Matrices | $14,000 - 16,500 | 95 - 100% |
| Biodegradable Rolled Erosion Control Products: | $15,000 - 32,000 | 95 - 100% |

Sources: Caltrans District 7 Erosion Control Pilot Study Report, June 2000, Table 4.1
Caltrans Soil Stabilization for Temporary Slopes: Guidance Document, Nov 1999.

## Pluses and Minuses

RECPs can provide a very effective means of short-term erosion control until permanent vegetation is established. All products, regardless of composition or cost must be properly selected according to the site conditions they are designed to address. Most importantly, they must be installed and maintained according to the manufacturer's instructions.

Additional information is available in the Caltrans Storm Water Quality Handbooks. Questions or comments may be directed to: Tom Huff • Caltrans Division of Environmental Analysis (916) 653-4167 or
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